



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,734	07/28/2003	Takeshi Morita	OKI.557	3806
7590	06/09/2004		EXAMINER	
VOLENTINE FRANCOS, PLLC Suite 150 12200 Sunrise Valley Drive Reston, VA 20191			EVERHART, CARDAD	
			ART UNIT	PAPER NUMBER
			2825	

DATE MAILED: 06/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/627,734	MORITA, TAKESHI
	Examiner Caridad M. Everhart	Art Unit 2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 1-7 is/are rejected.
- 7) Claim(s) ____ is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on ____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. ____.
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2-4-2004</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: ____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin, et al. (US 2002/0090745A1) .

Lin discloses a method including the steps of forming shallow trenches in a semiconductor substrate(paragraph 0002). Areas between the trenches are active areas(paragraph 0019). Partial etching of the deposited oxide is performed(first half of paragraph 0021). This corresponds to the step of reducing the area of regions of the pattern, of the deposited layer. Portions of the oxide layer that get removed are labeled ODR(paragraph 0021) and these portions are around the edges of the deposited layer pattern, as seen in Fig. 3. The areas remaining correspond to the active areas. The ratio of ODR to OD is between 0.2 and 0.8:1(paragraph 0021). The regions over the

trenches would have a different etch rate from the regions over the active regions, so that there would be a high etch rate region and a low etch rate region. This is shown in Fig. 3 after etching. The portions that are etched out of the dielectric prior to performing CMP corresponds to the patterning of a mask. Lin discloses a linear relationship between optimum thickness of dielectric to be removed through CMP and the quantity "OD for CMP density" wherein PA is defined as percentage of active areas (OD) relative to total wafer area and PS is percentage of sub-areas (ODR) relative to total wafer area and "OD for CMP density" is defined as $Pa \times (100 - PS)$ (paragraphs 0023-0026). OT is the optimum thickness (paragraph 0027). The relationship is a method of estimating remaining film thickness (the relationship is also shown in Fig. 4). Although Lin is silent with respect to a mask, the deposited dielectric which is then patterned corresponds to a mask, so that it would have been obvious to one of ordinary skill in the art that the method taught by Lin could be applied to a mask because a mask is a deposited layer, and the method taught by Lin can be applied to any deposited layer. Although Lin is silent with respect to the division of the substrate into segments, Lin teaches the substrate is divided by STI (shallow trench isolation) (paragraph 0002), which divides the wafer into segments, so that it would have been obvious to one of ordinary skill in the art that the wafer is subdivided into segments by the process of isolating regions with STI because the STI divide the wafer into areas which are isolated from each other.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US 5,948,573).

Takahashi discloses a method which includes the steps of dividing the wafer into circuit blocks (col. 1, lines 13-16) or meshes (col. 5, lines 5-12), calculating a pattern ratio (col. 2, lines 1-7), forming a mask pattern (col. 4, lines 1-7) and forming a layer to be polished by CMP on the mask pattern. The thickness of the layer is related to area (col. 9, lines 5-15 and col. 10, lines 52-60). The areas of the meshes is related to thickness (col. 10, lines 20-37, col. 22, lines 54-67, col. 23, lines 1-15, and col. 24, lines 15-50). There is also a step which corresponds to the obtaining reduced regions (col. 23, lines 5-15) in which the thickness of the layer is related to the width of the deposited layer. The reduced region is given the same area as the active layer (Fig. 13 shows W and Wo). Although Takahashi is silent with respect to the formation of trenches, it is clear that the raised and lower portions of a substrate (Fig. 4B) would include the formation of trenches, so that it would therefore be obvious to one of ordinary skill in the art that the formation of trenches is encompassed by the disclosure made by Takahashi.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Everhart
5-28-2004

C. Everhart
CARIDAD EVERHART
PRIMARY EXAMINER